Abstract: This invention relates to apparatus and method for power management and especially to power management integrated circuits (PMICs). In one aspect the invention relates to a PMIC (102) having an internal non-volatile memory (NVM 115) for storing boot settings for the PMIC. The PMIC also has control circuitry (111) for detecting whether a source of boot settings is available, such as an NVM (202) external to the PMIC, and, if so, using any settings stored in the external source in preference to the relevant settings stored in the internal NVM. The external settings can thus override any internal settings, which is useful for fault diagnosis and/or development. In one aspect the PMIC may have programming circuitry (401) for automatically programming boot settings from an external source into the internal NVM (115).
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06F1/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. RELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tbody>
<tr>
<td></td>
<td>paragraph [0011] - paragraph [0018];</td>
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<td></td>
<td>paragraph [0028] - paragraph [0029];</td>
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<td></td>
<td>paragraph [0034] - paragraph [0045]; claims 1-5</td>
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<td>Y</td>
<td>US 2003/229752 A1 (VENKITESWARAN SREEKRISHNAN [IN])</td>
<td>4, 5, 24</td>
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<td>11 December 2003 (2003-12-11)</td>
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<tr>
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<td>paragraph [0028] - paragraph [0030];</td>
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</table>

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

*" document member of the same patent family

Date of the actual completion of the international search: 3 November 2010

Date of mailing of the international search report: 17/01/2011

Name and mailing address of the ISA:

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Authorized officer:

Alonso Nogueiro, M

Form PCT/ISA/210 (second sheet) (April 2005)
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<td>US 6 035 395 A (SAITO TOSHIMITSU [JP]) 7 March 2000 (2000-03-07) the whole document</td>
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INTERNATIONAL SEARCH REPORT

Box No. II  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claims Nos.:  
   because they relate to subject matter not required to be searched by this Authority, namely:

2. □ Claims Nos.:  
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. □ Claims Nos.:  
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III  Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

   see additional sheet

1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. □ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

   1-7, 18, 19, 22-24, 29-32, 79-83

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

- No protest accompanied the payment of additional search fees.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7, 18, 19, 22-24, 29-32, 79-83

The invention is directed to a method for booting an integrated circuit. The integrated circuit comprises an internal non-volatile memory for storing boot settings and a data interface for connecting to an external source of boot settings. The method boots the integrated circuit from the external source after detection of presence of the external source of boot settings. If no external source of boot settings is detected, the method boots the integrated circuit from the internal memory. The method furthermore automatically detects the interface to which the external source of boot settings is attached by using a handshake protocol.

2. claims: 8-10, 27

The invention is directed to a method for booting an integrated circuit. The integrated circuit comprises an internal non-volatile memory for storing boot settings and a data interface for connecting to an external source of boot settings. The method boots the integrated circuit from the external source after detection of presence of the external source of boot settings. If no external source of boot settings is detected, the method boots the integrated circuit from the internal memory. The method furthermore boots the integrated circuit with protected boot settings from the internal memory.

3. claims: 11, 12, 28

The invention is directed to a method for booting an integrated circuit. The integrated circuit comprises an internal non-volatile memory for storing boot settings and a data interface for connecting to an external source of boot settings. The method boots the integrated circuit from the external source after detection of presence of the external source of boot settings. If no external source of boot settings is detected, the method boots the integrated circuit from the internal memory. The method furthermore loads the boot settings into the volatile memory of the integrated circuit.

4. claims: 13, 25, 26
The invention is directed to a method for booting an integrated circuit. The integrated circuit comprises an internal non-volatile memory for storing boot settings and a data interface for connecting to an external source of boot settings. The method boots the integrated circuit from the external source after detection of presence of the external source of boot settings. If no external source of boot settings is detected, the method boots the integrated circuit from the internal memory. The method furthermore checks if the internal non-volatile memory has been programmed.

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5. claims: 14-17, 33-56

The invention is directed to a method for booting an integrated circuit. The integrated circuit comprises an internal non-volatile memory for storing boot settings and a data interface for connecting to an external source of boot settings. The method boots the integrated circuit from the external source after detection of presence of the external source of boot settings. If no external source of boot settings is detected, the method boots the integrated circuit from the internal memory. The integrated circuit furthermore comprises an internal non-volatile memory programming circuitry for programming the internal non-volatile memory with boot settings.

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6. claims: 20, 21, 57-76

The invention is directed to an integrated circuit comprising a USB power input and current limiting circuitry for the USB power input.

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7. claims: 77, 78

The invention is directed to an integrated circuit for providing a regulated power supply via an output terminal having at least a capacitive load connected between said output terminal and a reference voltage, the integrated circuit furthermore comprising a linear or non-linear regulator.

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<th>Patent document cited in search report</th>
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